NTi AUDIO

CINEMA METER

OPERATING MANUAL

XL2

HANDHELD AUDIO AND ACOUSTIC ANALYZER

Contact Details

NTi Audio AG
Im alten Riet 102
9494 Schaan
Liechtenstein, Europe

Tel.: +423 239 6060
Fax: +423 239 6089
E-Mail: info@nti-audio.com
Web: www.nti-audio.com

NTI Americas
PO Box 231027
Tigard, Oregon 97281
USA

Tel.: +1 503 684 7050
Fax: +1 503 684 7051
E-Mail: americas@nti-audio.com

NTI China
Ganglong Lisheng Mansion
Room 701, No 60, Suli Road
215168 Suzhou, China

Tel.: +86 512 6802 0075
Fax: +86 512 6802 0097
E-Mail: china@nti-audio.com

NTI Japan
Ryogokusakamoto Bld. 1-8-4
Ryogoku, 130-0026 Sumida-Ku
Tokyo, Japan

Tel.: +81 3 3634 6110
Fax: +81 3 3634 6160
E-Mail: japan@nti-audio.com

NTi Audio is an ISO 9001:2008 certified company.

Firmware V2.40
Version 2.40.00 / August 2012

All information subject to change without notice.
© All rights reserved.
® Minirator is a registered trademark of NTi Audio.
™ XL2, EXEL, M4260, M2210, M2215, MA220, MR-PRO, MR2 and TalkBox are trademarks of NTi Audio.

Made in Switzerland

Table of Contents

1. Introduction **4**

2. Installation **6**
- Update the firmware 6
- Install the options 6
- Verify options installation 7

3. Getting Started **8**

4. Create a New Cinema **9**

5. Screen Overview **12**

6. Calibrating a Cinema Channel **14**
- Capturing a measurement 17
- Calculating Average of captured traces 17
- Storing a completed channel test 18
  - Store 18
  - File overwrite 19
  - Store and create verify test 19
  - Discard changes 20
  - Show mean deviation 20
  - Back 21
- Multi tone Headroom test 22
  - Loading a headroom test 22
  - Conduct a Headroom Test 23

7. Verify a Cinema **24**
- Lock into Verify Mode 28

8. View verification results **29**

9. EXIT **31**

1. Introduction

Thank you for purchasing the Cinema Meter Package for the XL2 Audio and Acoustic Analyzer. It is a functional extension for all XL2 analyzers in the market, allowing you to efficiently commission and monitor the audio setup in commercial cinemas following the SMPTE ST 202:2010 standard and the SMPTE RP 200:2012 recommended practice.

The Cinema Meter Package includes:

- Spectral Limits Option
- Cinema Assistant Option
- Audio CD with Cinema Meter test signals
- Data CD with PDF user manual and test signals for the MR-PRO audio generator

Cinema Meter Package has been developed in co-operation with Meyer Sound and provides support for calibration according to the SMPTE ST 202:2010 standard as well as the SMPTE RP 200:2012 recommended practice. It provides an efficient workflow for setting up all screen channels, the surround channels as well as the LFE channel.

Each measurement project is designated to a "cinema" and each cinema is separated in its own directory on the SD card of the XL2 for clearer organization of the resulting measurement data.

Assisted tasks select the target frequency response (depending on the cinema size) and pre-define test patterns for every individual cinema.

The cinema engineer then tunes the frequency response for each channel and adjusts the absolute levels according to the pre-defined tolerance patterns. Single measurements at a "Golden Seat" as well as measurements averaged over various seat positions are supported.
Specific headroom tests for all channels ensure that maximum dynamic range is provided without clipping the live audio material.

For each channel a response reading can be recorded at the reference position which is then used as the comparable reference for all verification measurements.

Measurement verification is supported by an assisted mode, allowing periodic measurement, documentation and verification of the response of each channel. Tolerance limits indicate to the service technician whether tests have passed or failed

enabling him to notify the cinema engineer that the system needs adjusting.

For simplification, the verification mode can be locked so that the XL2 analyzer boots with only that specific measurement task activated.

The cinema engineer can recall his calibration data at any time and continue executing more detailed measurements for system verification or trouble-shooting of each channel. A designated viewer for verification measurements assists the cinema engineer with comparing the verification data with the reference measurements.

Warning

Protect your ears

Procedures in this manual require that synthesized test signals are played back through the B chain of a cinema. These signals can be very loud and exceed the normal levels and can thus cause damage to speakers and to your ears if used improperly.

Check the volume control of your amplifier or the level setting of the signal generator before unmuting the signal chain.

Always wear hearing protection if in doubt.

2. Installation

To operate the Cinema Meter you need the latest XL2 firmware as well as the Spectral Limits and the Cinema Assistant Options installed.

Update the firmware

Cinema Meter is supported by the XL2 firmware V2.40 and higher. For the firmware update, register your analyzer at http://my.nti-audio.com and proceed as instructed on the XL2 support page.

Install the options

Please use the license numbers printed on the license card inside your purchased Cinema Meter Option. The license numbers are valid for activating the options on a single XL2.

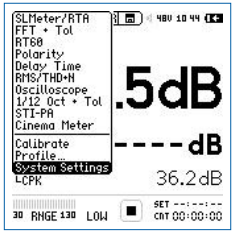
Follow the installation procedure described on the license card inside the Cinema Meter Option.

Licence Number / Lizenznummer
English:
Thank you for buying this option for your XL2 Audio and Acoustic Analyzer. This license number is valid for a single XL2.
Deutsch:
Danke für den Kauf dieser Option für den XL2 Audio- und Akustik-Analysator. Diese Lizenznummer ist für einen XL2 gültig.
Licence Number / Lizenznummer:
XL2 Spectral Limits License Number:
9999 9999 9999 9999
XL2 Cinema Assistant License Number:
9999 9999 9999 9999

Example of a license card with sample numbers only.

Verify options installation

After installing the new firmware releases and the options, you can visually verify the installation.



Select **System Settings** from the main menu and press ↵.

Use the page key ⧉ to bring the information screen into view.

The firmware version is displayed at the top. The version must be 2.40 or higher.

Both the Spectral Limits Option as well as the Cinema Assistant must be installed. Other options may be installed but are not required to operate the Cinema Meter.

3. Getting Started

In order tto understand the fundamental operation of the XL2 the user should be familiar with the XL2 Operating Manual, available for download at www.nti-audio.com/XL2.

The fundamental steps of the Cinema Meter workflow are:

- Create a cinema
  Assign name and other related parameters by executing the assistant **Create new cinema**. This creates a series of 8 tests; one for each speaker.

- Calibrate a cinema
  Tune the frequency response and the absolute levels to match the SMPTE tolerances. Measure at different seating locations and capture up to eight traces, at different measurement positions, into the XL2 memory.
  Define the reference curve among your measurements and let the assistant calculate the tolerance patterns for later verification measurements.

- Verify a cinema
  This assisted mode guides the service technician through the verification measurements to determine whether the channel still performs to the tolerances defined earlier. Measurements are stored for later comparison.

- Lock into verification
  This mode locks the functionality into the verification mode after starting up the device and simplifies the operation for verification users.

- View verification results
  The cinema engineer can review all the measurement data obtained by the service technician to see when and how the behavior of the channel has changed.

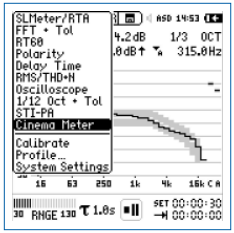
All these steps can be repeated for each channel in every cinema in any order.

You may recall previously-stored measurement sequences at any later time. Both the test configuration and all captured traces are stored. You may then continue adding new traces or replace individual traces and store the complete test again.

4. Create a New Cinema

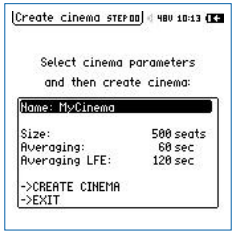
In this chapter we create a new cinema. An individual folder for each cinema is created on the file system of the XL2 within the folder "Cinema".

Each cinema folder then contains the test templates with tolerance calculation rules depending on the size of the cinema.



Start the Cinema Meter by selecting the function **Cinema Meter** from the main function menu list and pressing ↵ to launch it.
A splash screen is displayed for 3 seconds or until you press ↵.

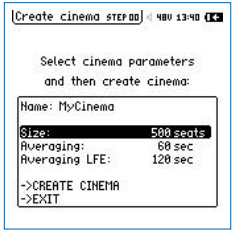
Select **1. Create new cinema** from the menu and press ↵ to start the process.



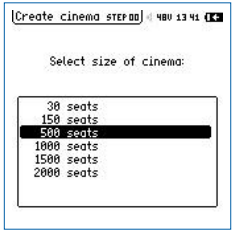
The cinema parameter overview opens. Here you can adjust the parameters for the selected cinema.

To name a new cinema, select Name with the rotary wheel and press enter ↵.

Define the cinema name using the rotary wheel and the keys as indicated on the screen. Press the OK key to confirm the name. This brings you back to the cinema parameter overview.



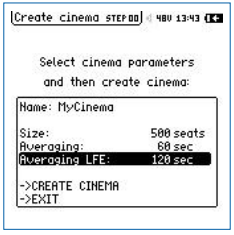
You may specify the number of seats in the cinema by selecting Size. The number of seats selected determines which response pattern is used, as proposed in the SMPTE ST 202:2010 standard.



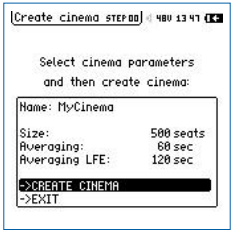
Select the number of seats in the cinema. Cinema size of 500 seats applies the standard X-curve while other cinema size selections adjust the X-curve as described in the table below.

	Number of seats					
Freq [Hz]	30	150	500	1000	1500	2000
2000	0dB	0dB	0dB	0dB	0dB	0dB
4000	1.0dB	0.5dB	0dB	-0.5dB	-1.0dB	-1.5dB
8000	2.0dB	1.0dB	0dB	-1.0dB	-2.0dB	-3.0dB

Select the averaging time for the frequency response measurements. Default is 60 seconds, giving a level accuracy of ±0.5dB at the lowest frequency. With 30 seconds the lowest frequencies will have an uncertainty of ±1dB.



Select the averaging time for the LFE channel. As the LFE handles only low frequencies the default is set to 120 seconds.



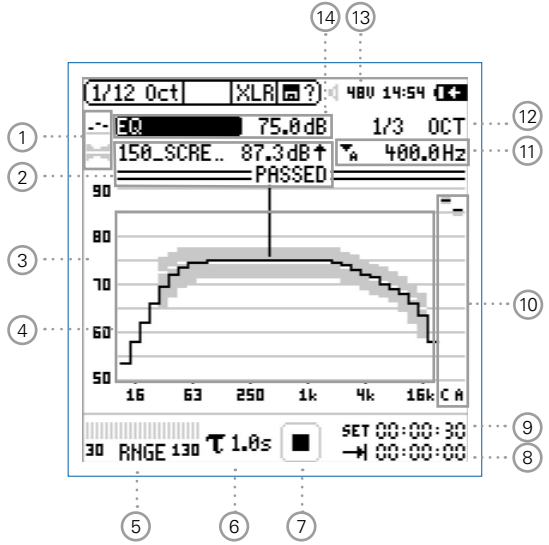
You may now create the template for that cinema by selecting **--> CREATE CINEMA** and pressing ↵.
The assistant then creates the folder with the cinema name and generates the appropriate tests in that directory.

Please note that all the cinemas are created in the root directory "Cinema" on the SD card. Possible pre-existing cinema subdirectories are overwritten if you choose the same cinema name and confirm the overwrite.

During the creation process numerous messages are displayed informing you about the progress. After the successful creation of the measurement template, the cinema meter assistant will be back in the main menu, ready for the next tasks.

5. Screen Overview

All the frequency response measurements are based on the **1/12 Oct + Tol** measurement function. This function is automatically loaded when a cinema is calibrated or verified.
All required functionality is explained in this manual. There is however more in-depth functionality explained in the XL2 user manual. Here is a typical screen:



(1) Result Symbols / Capture
Select this to capture measured traces, manipulate them and handle tolerance files.

(2) Tolerance file name / Shift level
Shows the actually selected tolerance file and the reference level for the tolerance. With this you may manually shift the tolerance. The overall result and possible spectral violations are shown below.

(3) Y-Scale setting
Select the Y-Axis with the rotary wheel and confirm with enter.
Select the zoom factor between 2.5 and 20 and confirm with enter.
Scroll up and down with the rotary wheel to select the Y-axis range.
Confirm with enter.

(4) Spectral Measurement Result
Spectral results in 1/1, 1/3, 1/6 or 1/12 octave band resolution. Adjust the resolution at (12).

(5) Input Range
Access and display the physical input range of the Analyzer.

⑥ **Time Weighting**
Offers selectable time weighting of 0.1, 0.2, 0.5 and 1.0 second.

⑦ **Run Indication**
The run indication shows the measurement status running, paused or stopped. Various measurement settings are locked during ongoing measurements, such as changing the input range or the preset measurement time.

⑧ **Actual Measurement Time**
Shows remaining measurement time in hrs:min:sec. The setting is always set to single measurements. Start the measurement by pressing the ▶■ key.

⑨ **Preset Measurement Time**
Adjustment of measurement time period for single timer setting.

⑩ **Broadband Results**
User-selectable display of broadband results:
A for A-weighted broadband sound pressure level
C for C-weighted broadband sound pressure level
Z for unweighted broadband sound pressure level
- for no display

⑪ **Readout Frequency**
You may select any frequency to read out individual levels. The selected frequency is indicated by the cursor arrow. Choose between Automatic and Manual settings.

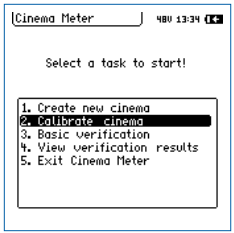
⑫ **Setting of Test Result Resolution**
Set the spectral result display to 1/1, 1/3, 1/6 or 1/12 octave band resolution.

⑬ **Phantom Power of Microphone**
Phantom power / ASD Indication.

⑭ **Measurement Result**
Actual level result of the indicated frequency band. Select the result of interest (EQ, live or any captured reading). The actual level reading at the cursor arrow position is shown.

6. Calibrating a Cinema Channel

Once the cinema templates are created using the **Create new cinema** assistant we are now ready to do the calibration measurements. During this process we will measure and verify the frequency response, calibrate the absolute levels according to the SMPTE requirements and conduct a headroom test to verify sufficient dynamic range for every channel.



Start the calibration process by executing the **2. Calibrate cinema** assistant in the Cinema Meter mode.

Select the cinema. The alphabetic list of cinemas represents all cinemas that have been previously created.

Choose a speaker you intend to calibrate. The complete test definition, including any previously-made measurements, is loaded.

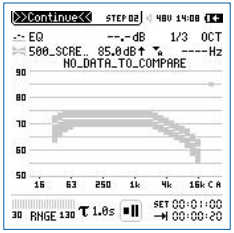
The test names comprise a test attribute (fRes), a sequential number and the channel descriptor (e.g. BsL) as above.

Test Attribute	Test Description
fRes	Frequency Response measurements and absolute C-weighted level adjustments (except for the LFE channel).
Hdrm	Head room tests

This is the level definition for the absolute levels defined in the templates according to SMPTE ST 202:2010 and SMPTE RP 200:2012.

File name	Level C-WTD	Channel Description
L	85 dB	**L**eft screen channel
C	85 dB	**C**enter screen channel
R	85 dB	**R**ight screen channel
Ls	82 dB	**L**eft **s**urround channel
Rs	82 dB	**R**ight **s**urround channel
BsL	82 dB	**B**ack **s**urround **L**eft channel
BsR	82 dB	**B**ack **s**urround **R**ight channel
LFE	–	**L**ow **F**requency **E**ffects channel

Start with a frequency response test. Select the speaker you want to test and press ↵.



The minimum and maximum tolerance limits for the selected speaker are represented by the displayed grey bar. Additionally the ideal curve is plotted as a white line.
The absolute levels of the tolerance limits are set according to the SMPTE.

This pre-defined configuration cannot be altered by measuring additional curves. This means you may later delete all captured traces and the arrangement remains still as pictured.

Place the instrument and the measurement microphone at the first measurement position. This will most probably be the reference position or ideal seating position.

According to SMPTE ST 202:2010 and SMPTE RP 200:2012 the reference position is in the middle between L and R and 2/3 back in the room. Other seat positions for spatial averaging may be added later.

It is highly recommended to place the microphone on a stand and move a few meters away during the measurement, avoiding reflections from standing too close.

As the tolerance bands specified by SMPTE ST 202:2010 are very small, we strongly recommend the use of a microphone with a class 1 frequency response, such as the NTi M2210 measurement microphone.

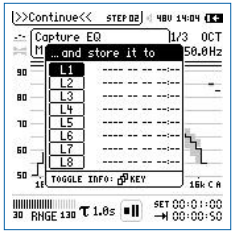
Use the pink noise signal generator on your cinema processor, or the supplied -20 dBFS pink noise. Adjust the outputs of your cinema processor to match the specified reference level for your theater for each channel.

Start a measurement with the START button ▶■ on the XL2 keyboard. The measurement is finished once the set time in bottom right corner of the screen has elapsed. The result is the level averaged (EQ) over the selected time period.

The bar on top of the graphical spectrum shows either **PASSED** if all measurement points are within the tolerance limits, or the violating measurement points are indicated with a small vertical bar. The limit LED button of the XL2 reflects the overall measurement result. It lights green if the test passed and red if a tolerance limit violation occurred.

Capturing a measurement

Assuming the measurement is acceptable, we might want to store this for later use or comparison. For this we use the Capture feature.
Select the trace control icon with the rotary wheel and press enter ↵.

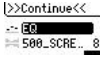


Select **Capture EQ** and press enter ↵ to store this first reading. You will be offered 8 possible storage locations. The default reading names are named after the speaker name with consecutive numbers but you are free to alter them.

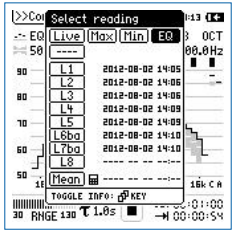
A stored reading is then indicated by its time stamp. You can overwrite the captured reading any time by storing a newer reading in that location.
Move the analyzer to another measurement position and conduct the next measurement for the same speaker by pressing ▶■. Once the measurement time is elapsed you will see the next measurement result on the screen.
Capture this as well if desired until you are satisfied with the number of measurement locations or until the capture buffer is full.

Calculating Average of captured traces

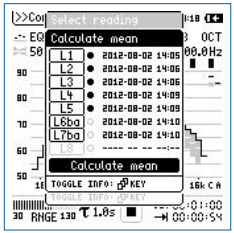
For verification purposes and also for later steps we want now to calculate and display the averaged response curve out of individual readings.



Select the reading selector with the rotary wheel and press enter ↵.



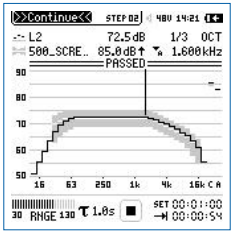
You see the reading selector menu where you can select any reading from the capture list. At the bottom you can also select **Mean**. But this memory is still empty and we have to calculate it first. We do this by selecting the calculator item next to **Mean** using the rotary wheel and pressing enter ↵.



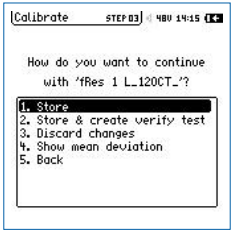
This opens the calculation selector menu offering all captures for the averaging process. Select those you want to consider for the calculation by selecting the capture with the rotary wheel and pressing enter ↵. A considered capture is indicated by a black dot.

Scroll to **Calculate Mean** and press ↵. This calculates the Mean capture. You see now that the Mean reading has a time stamp and can be used like any other capture. The Mean calculation process can be repeated at any time later.
Leave the menu by pressing ESC.

Storing a completed channel test



To continue the procedure once you have completed the adjustments and measurements on that specific channel, select **>>Continue<<** on the top left corner of the measurement screen. You may also reach this by pressing ESC.



This opens a menu allowing you to define the further use of your acquired data. Options are explained here:

Store
Select this entry to store all test definitions and the captured data of a test including the last reading on the display.

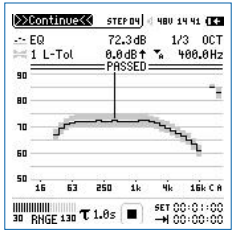
This saves the test under the speaker channel number that you are working with and asks you whether you want to continue with another channel.

File overwrite
Please note that previously-stored results are automatically overwritten.
Should you wish to keep older measurements then we advise you first to create a new cinema with a different name.

Store and create verify test
Stores the entire test as described before then creates the test template for the verification mode and displays it for visual verification.

The assistant copies all the necessary settings from this test, applies the appropriate tolerances and stores the last displayed reading as the reference curve for the verification tests.

Once the test is created you can view the created **Verify test**. Press **OK** to view the created test.



Activate the test signal once more and verify that the test is really passing.
Repeat the measurements if in doubt or press **>>Continue<<** to finish the process and continue with another channel.

The intention of the verification procedure is to allow a service technician to conduct guided measurements and confirm that the performance of a speaker has not changed.

Please note that the reference curve used for the verification procedure is the curve that was on the display immediately before executing this step. In case you want to record a distinct measurement trace at the reference position then you should do this just before you call this menu item.

Using the last trace on the display as the base for the reference trace has the advantage that the advanced user can:

1. Measure the reference curve at the reference position just before the script is executed.
2. Choose any of the captured traces for display (select best)
3. Choose a number of captures to be averaged in MEAN (spatial averaging). Select then the MEAN for display before executing **Store & create verify test**.

You therefore have the choice to either conduct a measurement at the reference position or load any previously-captured reading into the display.

Discard changes

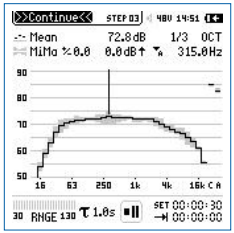
Select this menu item in case you have no intention to store the measured data. This can be the case if you have already stored the data and did some more measurements for investigation purposes that are not required to store.

The acquired data is not saved to a file and thus all the captures taken after the last **Store** will be lost.

You will then be asked whether you want to continue with other channel measurements in the same cinema.
Yes brings you back to the channel selection while **No** brings you back to the main menu.

Show mean deviation

Select this item to display the mean curve plus deviations of all the previously-calculated readings.



Min/Max values are displayed as a grey band and the mean values as a solid white line. You may now select the Result Symbols using the rotary wheel and choose any of the captured traces to be displayed within the Min/max limits.

Back

This menu entry brings you back to the measurement screen with no changes and allows you to continue your measurement work in your current setup.

Multi tone Headroom test

The headroom test is a specific test designed by Meyer Sound allowing the advanced sound engineer to test the available headroom of the sound system before non-linear effects appear.

The headroom test is an adjustment test only and is not available in the basic verification mode. With the wide band multi tone test the screen channels are measured, while a dedicated low frequency test signal is used for the effects channel (LFE).

Protect your ears

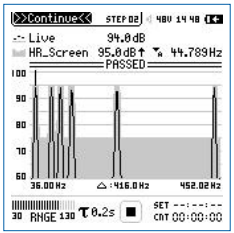
The headroom test applies sound pressures of up to 105 dB SPL from multi tone signals. Such levels can result in hearing loss and damage your ears if not protected.
Before performing this test:

- Be sure others are clear of the area of high SPL
- Verify level settings first
- Always wear hearing protectors for this test.

Loading a headroom test

There are two headroom tests, one for the screen speakers and a separate one for the LFE channel. Start any of these two tests within the **2. Calibrate Cinema** and choose **Hdrm-Screen_FFT_** or **Hdrm-LFE_FFT_** from your current Cinema directory.

The test definition automatically activates the FFT function module with pre-selected screen views.

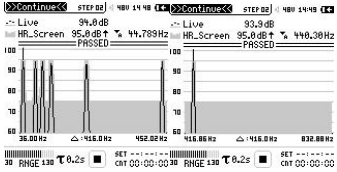


The multitone tests expect certain signal components to be present and others must not be higher than certain levels (75dB in the example to the left).

The FFT Analysis has been chosen and setup for its high resolution within these low frequencies. But since the XL2 screen itself only can show 143 FFT lines per page, the full display range has to be extended over multiple pages.
The headroom screen test data is therefore spread over two pages covering the linear frequency range from 38 Hz up to 832 Hz, while the headroom LFE test requires a total of four FFT pages ranging from 10 Hz up to 200 Hz.

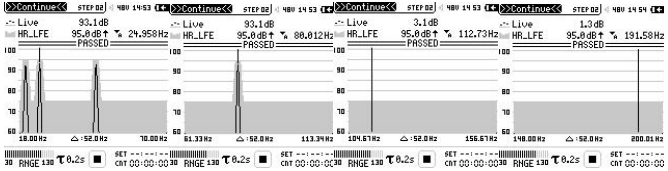
The page key steps sequentially through all these pages. To get the full view of the FFT pages you have to align them sequentially. The screens have sufficient overlap so that no spectral content is lost.

The screen channel headroom test appears as follows:



You may observe that the right-most signal bin on the left screen is again visible on the left of the right-hand screen.

The LFE headroom test appears as follows:

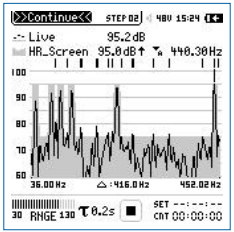


The four pages again overlap sufficiently so that we can monitor if harmonic or intermodulation frequencies appear anywhere in the spectrum due to clipping of the amplifiers.
The tolerance patterns matches the multi tone signal that must be played through the speaker under test. The signals can be found on the Cinema Meter Option CD.

If you wish to store these files on the MR-PRO audio Generator for convenient, portable playback, you may copy the files from the directory "Test Signals for MR-PRO\CINEMA" of the enclosed User Manual CD.

Conduct a Headroom Test

Run the appropriate headroom test signal from the cinema processor library and start the FFT measurement by pressing play ▶■. If the system operates in its linear range, then the amount of harmonic and intermodulation distortion remains under the spectral limits.
To playback and level the signal, follow your internal procedures.



With a signal exceeding the linear range the harmonics will exceed the tolerance limits and the test indicates "Fail".
In the example, the black lines on top of the spectrum display indicate tolerance limit violations throughout the entire spectrum.

7. Verify a Cinema

The cinema verification mode allows a service technician to periodically conduct maintenance measurements within a cinema, following instructions displayed on the XL2 screen.

The intention of these measurements is to find out whether the speaker performance at the reference location is still as originally defined and documented by the cinema engineer who calibrated the cinema.

The operator sees the measurement results and the pass/fail result. He can repeat a failed test but he is not able to alter the tolerance limits.

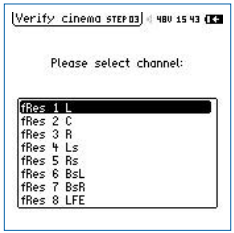
In case of continuous fails of certain tests the service technician can then notify the cinema engineer who has access to the measurement history of that speaker.

The service technician is not necessarily a measurement expert, as he has only to follow the clear instructions given on the screen.

Start the verification assistant by selecting **3. Verify cinema**.

Select the cinema.
The available cinemas have been previously created by the cinema engineer and are presented in alphabetic order. Confirm your selection with enter ↵.

You are now requested to place the measurement microphone at the reference position. The microphone position remains unchanged for all the channels verified in this process.
Adjust the height of the microphone according to the specification of the cinema engineer.
Continue with enter ↵.

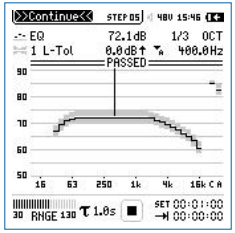


Select the channel you want to verify. Please note that the only channels available for the verification are those that have been previously commissioned by the cinema engineer.
Confirm with enter ↵.

Use the pink noise signal generator on your cinema processor, or the supplied -20 dBFS pink noise on the channel you have selected to verify.

Press enter ↵ to confirm once the noise signal is playing.

Make sure that you have no interfering noises present in the theatre (no talking and keep the doors shut).
Start the measurement by pressing enter ↵.



The measurement starts immediately and you see the total time as well as the remaining measurement time in the bottom right corner.
The measurement result is displayed after the measurement period has elapsed.

At this point you may use the rotary wheel to select either the readout frequency field (400Hz in the above example) or the Y-Axis where you can zoom and scroll the levels.

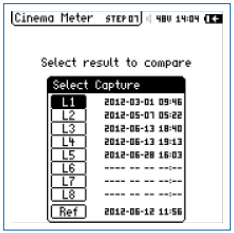
Please note that these viewing scroll actions do not influence the measurement result at all; they are just altering the scaling.

Once you are done with the adjustments, select **>>Continue<<** with the rotary wheel and press enter ↵.

In case the measurement did not pass the stored tolerance limits you will be notified with the limit LED lighting up red and with a "Failed" message.
You can now select whether you want to repeat that measurement.

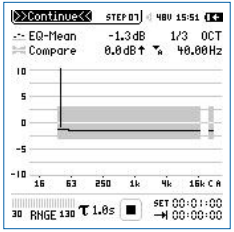
Choosing **Yes** discards the current measurement and allows you to repeat this measurement step. A **No** selection brings this (failed) test forward.
Confirm your selection with enter ↵.

In the next step you may now compare the measurement results just acquired with either previous measurements or the stored reference. **No** skips this step.
Confirm your selection with enter ↵.



In case you choose **Yes**, you can now select the capture you want to compare your last measurement against. The selection can be any earlier stored capture (L1 to L8) or the reference trace. Note that the reference trace cannot be altered in the verification mode.

Confirm your selection with enter ↵.



You now see a relative display of your measurement result minus the selected reference capture. With no deviations you would see a straight line centered on 0dB.
Using the rotary wheel, you may now select the readout frequency field (40.00Hz in this example) or the Y-Axis where you can zoom and scroll the levels.

Once you are done with the comparison, select **>>Continue<<** with the rotary wheel and press enter ↵.

You are asked whether you want to do comparisons against other readings. Do so by selecting **Yes** or select **No** to continue with the next step in the script.
Confirm your selection with enter ↵.

You may store the measurement results or discard them. In case you select **Yes** then the measured reading is stored in the next free location L1 to L8. If all eight capture memories are occupied then the oldest capture is automatically overwritten.

This mechanism ensures that you and the cinema engineer always have access to the history of the last eight measurements. They are all complete with date and time stamps.
Confirm your selection with enter ↵.

This step completes the measurements for a specific channel. In the next screen you will be asked if you want to continue doing measurements in the same cinema but with another channel.

Yes brings you back to the channel selection menu and **No** finishes the Verification mode and brings you back to the main menu. Confirm your selection with enter ↵.

Lock into Verify Mode

If you select this menu item you are configuring the XL2 to always boot-up in the verification mode. This has the strong advantage that the occasional user can easily get to the verification mode.

Select **4. Lock into verify mode**.

A confirmation screen appears. Select **OK** to activate this locked mode or **Cancel** to return to the Cinema Meter menu.

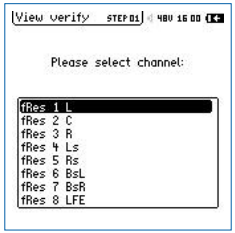
In this mode the XL2 analyzer always boots up in the locked verification mode.
Exit the locked mode at any time by selecting **Unlock** in the bottom left corner.

8. View verification results

The service technician has verified the cinema channels at various dates. This viewer allows you to look at this data and compare it against other readings.

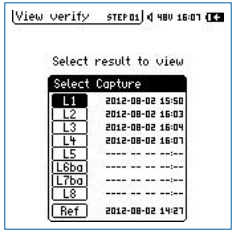
Select **5. View verification results** to enter the viewer mode.

Select the cinema.

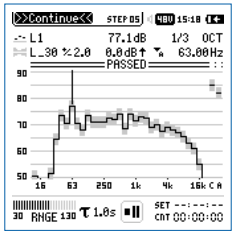


The list represents all channels containing verification results.

Select a channel.



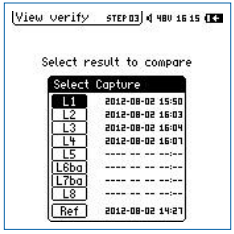
Select a first measurement result you want to visualize. The presented captures show the history of verifications of that channel. Each capture is marked with a time stamp.
The last capture in the list is the reference trace.



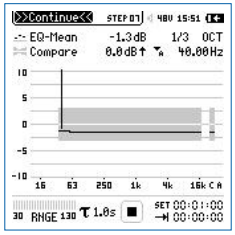
The measurement result is then visualized together with the applicable tolerance band and possible violations. Also the limit LED shows the overall status of that measurement.

You can zoom and scroll the Y-scale of the graph for optimizing the visibility of details. Select **>>Continue<<** in the top left corner once you are ready to continue.

You are then asked whether you want to compare the previously-selected measurement result against another capture.
This can be, for example, the reference curve to see the deviation to the original measurement or any other earlier capture for monitoring changes over time.



Select a capture from the list.



The screen shows you the differences between these two measurements accross the frequency spectrum as well as the broadband value difference.
You are again free to adjust the read-out frequency field and the Y-Axis scaling of the graph for best readability.

After having completed the views on a selected channel you may do the same with another channel in the same cinema or exit to the Cinema Meter menu.

9. EXIT

Selecting **6. Exit** terminates the Cinema Meter mode and return to normal XL2 operation.
You can restart the Cinema Meter at any later time via the main menu.